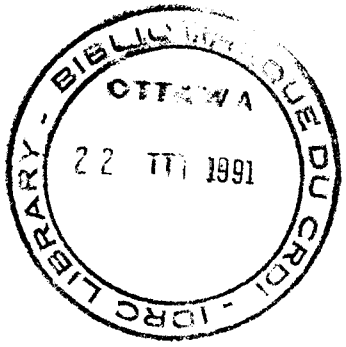

BUILDING RESEARCH INSTITUTIONS IN DEVELOPING COUNTRIES: A RESEARCH PERSPECTIVE

Hernando Gómez B.

Benjamín Alvarez H.

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SUMMARY

Although it is widely accepted in formal policies of international development agencies that aid is only developmental when it promises eventual self-reliance, the result of several projects sponsored by those organizations tend to reinforce the dependency syndrome. This fact may be related to the methods used in the flow of aid as well as to its scope. When the overall purpose of aid is to enhance the recipients' own possibilities, building local human and institutional capacity is at least as important as completing a research project or transferring specific technologies

There is, however, a stronger tradition and a more established methodology for designing, monitoring and evaluating research projects, the adoption of particular technologies or even individual learning than, than for promoting and assessing accomplishments in institution building, in spite that new development alternatives in Third World countries are today based on their institutional capacity to adapt to new demands.

Research on organizations and institution building can provide useful insights for approaching some of the problems and inevitable dilemmas faced by development agencies. Nevertheless there is a clear need for further research. This is particularly true in the case of the institutionalization of science and the utilization of knowledge.

This paper rapidly reviews some available literature on: (a) recent research approaches to institutions; (b) institution building; and (c) research institutions in developing countries; in order to propose areas of research, categories to be considered and issues to be addressed.

CONTENT

INTRODUCTION

INSTITUTIONS AS A RESEARCH SUBJECT

- Brief description of the field
- The intervention approach

INSTITUTION BUILDING

- Micro and macro-perspectives
- Building and achievement
- Incentives to performance
- Institution building and technology

BUILDING RESEARCH INSTITUTIONS

- Nature of research institutions
- Incentives in research institutions

BUILDING RESEARCH INSTITUTIONS IN DEVELOPING COUNTRIES

- Research orientation
- Research institutions and the social use of knowledge
- Research training institutions

BASES FOR A RESEARCH AGENDA

INTRODUCTION

Hardly anyone would question the proposition that teaching how to fish is more useful than handing out fish, or that building a solid research capacity in a less developed country is far more important than accomplishing one properly designed research project.

And yet, IDRC (as is the case with most donors which support research) is strongly biased towards project funding with two good reasons: first, that we know -or we think we know- more about how to design and evaluate scientific research projects, than how to build and strengthen research institutions. Second, that at any rate, we have -or feel we have- far more control over the success of a research project than over the success of a research institution. This consideration suffices to justify both efforts to understand the factors and processes leading to successful institutionalization of research in LDC's, and operational efforts to encourage such factors and processes.

This paper raises some issues that should be taken into consideration when operationalizing the philosophy of capacity building, preparing a research agenda and providing strategic support for research institutions in the particular case of developing countries.

We argue that although the main questions asked in practice are far from being answered by current scientific knowledge, research in this field, is more crucial than ever before and should be a substantial part of institution building efforts.

Discussion elements

a) **Institution** - We begin by a brief description on what we know about institution building, stressing the word "institution". It is very well known that there has been a long tradition of social research about institutions as "complex organizations"; some lessons may be learned from that effort.

b) **Institution Building** - The second part of the discussion will deal with the concept of "institution building", as an heuristic device for guiding development activities beyond the life of particular projects.

c) **Building Research Institutions** - Since the focus of this analysis is one kind of institution: the scientific, it is important to notice its special characteristics and the intrinsic limitations of existing theoretical frames; "building research institutions" will probably require specialized knowledge and special kinds of interventions.

d) **Building Research Institutions in Developing Countries** - The social and political contexts surrounding the process of "building research institutions in developing countries", deserve additional considerations. Research on this topic is scarce and both international and national agencies are involved, at least informally, in learning process.

Recommendations for a long-term research agenda will follow the discussions, as well as suggestions for initiating systematic analyses of the process of supporting the development of research training institutions by IDRC.

"INSTITUTIONS" AS A RESEARCH SUBJECT

Brief description of the field

Our ability to encourage the building of research institutions in less developed countries is, of course, conditioned by our knowledge about "institutions" themselves. Actually, we know some things about institutions or "complex organizations"; in fact, there are many -perhaps too many- insights and many partial, yet convincing, explanations. But the field is at once **crowded, ambiguous,** and with **too many paradigms.**

a) **Crowded.** The field is crowded in terms of disciplinary perspectives, types of institutions being focused, and underlying encompassing views:

- disciplines: from the formal-legal (Comte or Maine) and industrial engineering (Taylor) pioneers, through business administration, public management theory, economics, psychology and sociology, to cybernetics, systems and information theories;

- types of institutions analyzed: hospitals, private firms, governmental agencies, non-profit associations, community-based institutions and grass-roots movements;

- underlying global perceptions, which have been variously characterized, but which may be simplified to: (i) the split between the organization-as-machine vis-á-vis the organization-as-culture and; (ii) the split between emphasis-on-explanation vis-á-vis emphasis-on-management.

b) **Ambiguous.** The key concepts of the "institution building theory" have, of course, a nucleus that renders them meaningful and communicable between researchers; but such concepts are still surrounded by gray areas of vagueness or ambiguity, which prevent their practical utility. To begin with, "institution" (or "organizations"?) and "building" (or "development?), may be understood in slightly different ways and such minor nuances are magnified when carried on into lengthy, complex and self-referring speeches. They may be also compounded by differences and lack of clear definitions in epistemology, purpose, and specific subject matter that so much colour "soft" social research.

c) **Over use of paradigms.** Any "institution" can validly and consistently -though not, of course exclusively- be described and predicted as a case or a system. In both alternatives, there are several perspectives which can emphasize human interaction, efficiency, information, values, etc.

The abundance of partially competing and partially overlapping insights has encouraged efforts to develop high-order languages and to propose formal, axiomatic "theories". But again, several such languages and theories have been developed with equal elegance and equal apparent soundness.

Hence, the theoretical "state of the art" may best be described as a set of different order paradigms and subparadigms, each of which typically: (a) selects an "independent" or major explanatory variable; (b) develops a typology of institutions, according to the main categories of the selected variable, and (c) explains and predicts a range of "dependent variables" or of structural and behavioral features of the identified subtypes of institutions.

The intervention approach

Bureaucracies are too much and too important a part of real, everyday life to be the subject of mere theoretical controversy. Because of that an equally complex set of partially overlapping - partially exclusive paradigms of strategic intervention has been developed and applied in a wide variety of organizational contexts.

These approaches are broadly framed within one or another of the theoretical paradigms mentioned above; although they naturally tend to stress as "the independent variable" the one deemed to be easier to manipulate. Some of the variables thus stressed are:

- administrative relationships (organizational charts, flux diagrams and processes);
- legal frameworks (especially for public institutions);
- incentives, times and movements (the "industrial engineering" perspective);
- planning and monitoring systems (quality control techniques, strategic decision-making...);
- leadership styles (management by objectives, program budgeting...);
- the "human factor" (T groups, Z theory ...);
- the environment (inter-institutional awareness, strategic linkages ...); and
- the role of donor agencies (blueprint model, second and third generation, direct support and learning process approaches).

INSTITUTION "BUILDING"

Micro and macro-perspectives

The first period of technical assistance efforts carried out after World War II was characterized by a trial-and-error and transplantation approach. Very soon a realization emerged that a body of knowledge on how institutions evolve was needed. These studies were initiated and the expression "institution building" was coined.

Most literature on this concept is in manuscript form or as ephemeral material produced in response to internal needs of particular donor agencies at different times. Such a literature presents two facets of the concept: (a) the micro-organizational facet (which focusses on individual institutions based on the above-mentioned theoretical paradigms), and (b) the macro-social facet (whose main interest is the role of institutions in societies).

From the micro-organizational perspective, "institution building" refers to the deliberate process of developing institutions, or improving and expanding the existing ones, so that they can induce stable changes in patterns of action and develop belief systems within a given society. In this context, institutional variables such as the ones already identified by research on institutions as "complex organizations" are considered central (for example: leadership, organizational philosophy, orientation, programs, resources, clientele and internal structure).

From a macro-social perspective, institution building, considers the system of services needed to support the development of broad social and economic sectors. This includes the understanding of both local and community organizations, so as to promote the participation of their members in decisions and programs that affect their own lives.

In both cases, however, the crucial question is to identify the range of activities involved in "building" institutions.

Building and achievement

What is meant by "building"? Is it in the micro-organizational perspective the institution's ability to survive or grow or undertake additional programs?; or, instead, is it its ability to maximize the contribution to the general social well-being? Is it the satisfaction of relevant actors (e.g., owners, politicians, employers); or rather, the maximization of rationality and achievement of stated "official" goals?. Is it the capacity to modify or, rather, to adapt itself to the environment?...

And, if "institution building" is recognized (as it probably should) as a multi-dimensional concept, how its several (and perhaps mutually excluding) components can be weighed and measured? How to weigh and measure effectiveness, efficiency, morale adaptiveness, and the like?

Without neglecting the relativity of the "institution building" concept, it bears recalling that the "formal organization", or "bureaucratization" of human activities, was designed as a means to insure the successful achievement of collective goals (i.e. Weber's "rationalization" of the West). Some institutions, furthermore, are known to be more effective ("sucessful" at goal achievement) than others. We quote from an excellent attempt to summarize such knowledge in an axiomatic fashion:

> "Organizations which have the following mechanisms are much more lkely to have a high degree of effectiveness than organizations which do not have the mechanisms:
>
> a) The organization's economic system should be characterized by: i) high degrees of division of labor, ii) specialized departmentalization (except where there is a high degree of professionalization), and iv) continuous systems of assembling output.
>
> b) The organization's internal political system should be characterized by: i) high degree of legitimate decision making, ii) rational-legal decision making, iii) centralization with respect to tactical decisions (except where there is a high degree of complexity), and iv) maximum degree of centralization with respect to strategic decisions.
>
> c) The organization's external political system should be characterized by: i) a high degree of autonomy; ii) an ideology with high degree of congruence, priority, and conformity; iii) co-optation; iv) major elite co-optation; v) a high degree of representation; vi) major elite representation ; and vii) a major elite constituency.
>
> d) The organization's control system should be characterized by: i) a high degree of sanctions; ii) a norm-enforcer norm-conformer relationship which is basically secondary; iii) a sanction system with a high degree of grade; iv) a collectivistic sanction system; v) high degrees of communication, vertical communication, and horizontal communication; and vi) a communication system which primarily is instrumental, personal and formal." J.L.Price, 1968 [1]

Incentives to performance

The above organizational profile may well be understood as the general version of the "specificity", that Israel finds as one of the three basic "incentives to performance" of individual institutions in his recent survey of 159 agencies of LDC's financed by the World Bank [2].

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1 Organizational Effectiveness and Inventory of Propositions, Irwin, Homewood, I11, 1968, pp 203-204.

2 Institutional Development. Incentives to Performance. A World Bank Publication, The Johns Hopkins University Press, Baltimore and London, 1987.

Specificity would include two basic elements: (a) the degree to which it is possible to specify the objectives of a particular activity, the methods for achieving them, and systems of controlling achievement; and (b) the ways that the activity affects the participant actors. Those elements define the degree to which actors can be rewarded for their performance.

The second incentive postulated by Israel: "**competition**", refers more to the institution's relationship with its environment and the set of pressures brought to bear upon its personnel. Those pressures can be either political, economic or administrative.

Incentives can be also derived from "**management**", which includes the organizational structure, administration, policy, and so on. Some institutions are highly specific in the nature of their work and have high pressures to compete. Others, on the contrary, perform low specific activities and have low competitive pressures. Depending on their activities institutions differ in the extent to which they are exposed to different sources of incentives.

Although the relationship between incentives and performance needs to be explored, we know - or have very good reasons to believe - that, ceteris paribus, complex organizations are more likely to succeed (at their official goal attainment) when they meet the criteria of "specificity" and "competition" as broadly defined above.

"Building" is a purposive, voluntaristic notion, where the deliberate effort to strengthen the institution is underlined.

Thus, although "specific" and "competitive" organizations are by themselves easier to "build" than their non-specific and non competitive counterparts, there remain certain features whose manipulation by the interested parties may increase or decrease the probability of successfully "building" an institution of a given specificity and competitiveness. It is to those more "controllable" variables that the specialized literature on "institutional building" tends to refer. Milton J. Esman's "Institution Building Universe" remains the classic.

Considering the above variables and linkages mostly to be tools for "institutional building" a number of authors have developed useful measurement techniques (e.g. W.E. Bjur, 1983), sets of bivariate hypothesis (e.g. R.L. Duncan, 1975), and even detailed guidelines for action, such as the 38 strategies recommended by D.R.Derge (1968). They are all highly valuable references for the present research agenda.

In relation to institution building from a macro-perspective, Israel suggests that institutional capacity, one of the most important and scarce resources for development, can be improved through national strategies which, according to him, should include at least three elements: a greater awareness of the issues on the part of authorities and managers, an emphasis on low-specificity of subsectors and activities, and an adaptation of goals to the institutional capacity of the country.

Institution building and technology

Countries want to adapt to new requirements of global exchange in matters of commerce and technology; such adaptations, however, are based on capital, human resources and institutional capacity.

In the context of recent world economic and political restructuring it has been suggested that periods of fast growth (whether of particular sectors of society, industry or countries) are driven by the synergy of technological opportunities and well-adapted institutions [3]. New development alternatives for less industrialized countries (in Africa, South East Asia, Latin America and Eastern Europe) are then closely linked to their capacity to effect institutional changes in the appropriate directions.

Research on the institutional capabilities of large enterprises or sets of institutions tend also to indicate the existence of a set of variables associated with efficiency.

In water supply and sanitation, for instance, well-run companies in both Europe and Latin America have similar management practices, such as: (a) development of distinct organizational cultures; (b) long-lasting institutional memory and long-term objectives retain in focus; and (c) feedback and community trust [4].

BUILDING RESEARCH INSTITUTIONS

Another way to phrase a previous point made when discussing research on institutions is that: (a) formal organization is a means to achieve collective goals by breaking complex processes down into routine components, that is, by **reducing uncertainty**; but, (b) organizational success requires a high level of motivation and competitive stimuli to perform.

Nature of research institutions

Now, scientific research is an uncertain endeavor par excellence. There is no such a thing as an ars inveniendi, which means that formal organization, though without question, essential to the advancement of modern science, is likely to be less effective in this than in other realms of human activity (say, the assembly line or the army prototypes).

Further, by their very nature research institutions lean towards the "soft" structural style, so that their "economic" and their "inner political"

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3 Technical Change, Competitive Restructuring, and Institutional Reform in Developing Countries, Carlota Pérez (A World Bank publication, 1989).

4 Summarized from the paper: Water supply and sanitation: the challenge of the nineties, R. Yepes. (World Bank document, 1989) (Ref. 91).

systems (in Price's terms) would be rather unconductive to success (bureaucracy does kill creativity).

The differences between the "climate" of complex organizations, as appear in classical literature, and the "climate" of institution, such as universities, are so substantial that some have appealed to the notion of "anarchic environments" to describe the flexibility, ambiguity and openness of the goals and processes of academic organizations. Research centres, particularly in social sciences, participate of some of the characteristics of universities. They deal by definition with "low-specific activities".

Incentives in research institutions

Hence, it would be: a) the "control" and the "external political" systems; and b) the managerial and administrative approaches which make or break research institutions.

Even if the evidence is not as conclusive as above, the success or failure of scientific organizations appear to loom critically on "**motivations**" and on "environments":

a) **Motivation.** The creation of knowledge is not the kind of activity that can be monitored nor hired by parts, as the typical product of "bureaucracies" is. It is, on the contrary, a unique, less controllable from outside, and most absorbing process, that consequently demands intense and voluntary dedication of the individual researcher.

That is the simple but powerful reason why values and motives are known to play such fundamental roles in the history of science.

Among the many value and motivational issues that surround scientific activity, the one perhaps closer to the present concern is that of **institutional incentives**, i.e., of what kinds of behaviors are effectively encouraged and what kinds are effectively discouraged by the organization's systems of rewards and punishments.

As a matter of fact, many "research" institutions in developing countries appear to reward behaviors other than scientific creativity, such as teaching ability, popularity among students, conformity to in-house politics, ideologization of knowledge and the like. Donor agencies, on the other hand, tend to pay attention to the administrative aspects of projects rather than to their content and scientific achievements. Few final research reports are read and discussed, and time is usually spent on preparing and approving documents, leaving a marginal space to scientific exchange and to the professionalization and socialization of researchers.

In low specific activities with scarce financial resources, the non-pecuniary incentives play a key role. Thus, the processes management and training are crucial to motivation and performance.

b) **Environment.** Concerning the environment, Price's emphasis on coaptation " (see his description of the external political system) seems to be at odds with Israel's emphasis on "competition". But this apparent contradiction suggests a more general hypothesis, to guide research on this all-important aspect of scientific "institution building", namely: (i) the successful development of research organizations requires a high degree of social legitimization (Price's side) but (ii) only the competition among organizations and researchers may provide momentum to that development (Israel's side). That hypothesis may be grounded on evidence found in some analyses of scientific productivity.

Environmental issues related to science institutionalization refer to national as well as to international contexts. Now more than in the past, global changes are linked to the mechanisms of creating and applying knowledge in society. A research agenda for building research institutions for our times should be based on a broad perspective.

The following are among the specific "environmental" issues that can be included in a research agenda: (a) global changes and their impact on research institutionalization in LDC's; (b) degree of national political commitment to scientific development; (c) macropolicies and "national strategies" affecting science; (d) degree and types of interinstitutional competition for research resources (recognition, human, and financial); (e) types and expressions of the social demand for science; (f) roles and perceptions of the national elites concerning science.

Those analyses are to be accompanied, of course, by the "micro" issue of how effective the "external systems" of the institutions under study are at relating to the environment (that is, of how well their information gathering, planning, marketing, feedback collecting, and extending-linkages systems are functioning).

RESEARCH INSTITUTIONS IN DEVELOPING COUNTRIES

Institutions have barely been studied in the developing world; less so research institutions, and even less in any of the dimensions here identified to be critical for their success.

Research orientation

The guidelines suggested thus far, because they arise mostly from research in developed countries, need careful adaptation to LDC's contexts. Science is of course, universal (though scientists are not, as Pasteur pointedly added); its production is however subject to an international division of labor. This brings us the tricky empirical and normative question of what kind of scientific research we want (or can afford to hope for) in LDC's.

Is it realistic (or wise) to aim for first quality, frontier-opening scientific research in our countries? or is it better to borrow and adapt, taking

advantage of the LDC's condition of "late-comers"? In any case, however, it would be important to promote: (a) the availability of enough (and superbly trained) scientists to secure a scientifically-minded society, a proper teaching of all basic sciences, and an efficient adaptation of world knowledge; (b) the arts, the human and the social sciences (where culture and nation do make for substantive differences), and (c) the natural sciences and technologies capable of playing specific strategic roles in national development (e.g. in agriculture, tropical medicine, or in new exporting sectors to be decisively expanded such as, say, Japan did with microcomponents).

Research institutions and the social use of knowledge

If the social use of knowledge is stressed, then new considerations on the success of research institutions should be made. Research institutions could be judged by the intrinsic value of their products or in terms of their possible applications.

Just as individuals, formal organizations perform in relation to specific and complex "role sets" and relate to different "significant others".

Institutions dedicated to "pure" science thus need a set of complementing/competing/norm-setting institutions, and linkages, which very likely differ from those needed by their "applied" counterparts.

This could be illustrated by the functioning of a university or a private corporation.

The issue of pure vs. applied research keeps running back into the wider topics of the international order of science and of the proper insertion of developing countries within that order. For "science" is, of necessity, a circuit of multiple-steps and of multiple-institutions that endlessly (if partially) feed upon each other; steps and institutions which are concerned with (i) basic research, (ii) technological research, (iii) training of new scientists, (iv) development of academic and professional communities, (v) diffusion, and (vi) incorporation or production of goods and services.

This circuit has two major implications for the agenda here considered:

a) In evaluating and explaining the success of given research organizations attention should be extended beyond the set of national institutions, to the international net of relevant agencies.

b) The ability of a national society to generate truly significant contributions to science strongly depends upon the achievement of a "critical mass" of cultural, human and financial resources dedicated to it. That science is a long-term process, nourished by diversity, by patient trial-and-error, by heterogeneity of approaches, by accumulations and feed-backs is, by far, the safest conclusion of the several "sciences of science". To which it could perhaps be added that before such "critical mass" is achieved, the nation is in no position to fully internalize the fruits of knowledge.

Research training institutions

The critical masses of researchers, essential pieces of research organizations and networks, are professionalized and initially socialized in research training institutions. Fundamental values for working effectively in low specific activities with non-pecuniary incentives are developed there.

Research training institutions are of different kinds: graduate schools within large universities, research centres, private enterprises, networks and associations, and so on. Recent information indicates that the training capabilities of the existing research institutions in the developing countries is not negligible. In Latin America, for example, they have been identified over 600 research institutions in various fields, that either have or are interested in participating in the establishment of graduate training activities for young researchers.

Research training institutions are an unavoidable theme for public policies, given the fact that today, more than before, the products of scientific research and the consolidation of the social capital that science implies are vital for the prosperity of nations. However, there is not much that social research can offer to support decision making about institutional development aimed at preparing and maintaining a critical mass of scientists.

The following are samples of areas of practical interest related to institutional building that need further exploration: (a) policies for the development of the fourth level of education (postgraduate programs); (b) models of doctoral and post-doctoral studies; (c) financial systems (grants, fellowships, loans, etc.); (d) incentives to performance; (e) curricula; (f) environment; g) management; and (h) effectiveness.

BASES FOR A RESEARCH AGENDA

A fair case has hopefully been made here for the inclusion of the following as priority areas of research on scientific "institution building" for science and development in LDC's:

FROM A MICRO-PERSPECTIVE (focussing on individual organizations):

a) **Determinants of institutional development and performance**

- **Environmental variables**

1) Socio-political context
2) Culture
3) National policies
4) Funding agencies

- **Incentives**

1) Specificity
2) Competitiveness
3) Management
4) Values and motivational structure
5) Internal pressures

b) **Organizational structure**

1) Leadership
2) Management style
3) Type

c) **Results**

1) Basic research orientation
2) Utilization of research output
3) Impact on development
4) Relationships with other sectors of society
5) Clients, beneficiaries and resources
6) Insertion into the national and the international circuits of science.

FROM A MACRO-PERSPECTIVE:

a) The nature and functions of research networks, associations and scientific communities.

b) Comparative analysis of national policies.

c) International resources and policies for institutional development in LDC's.

d) The role and place of scientific communities in the development and utilization of research.

e) Insertion mechanisms into the international circuit of science.